

Science

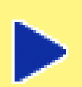
Science

The Case of the Disappearing Sugar

by Fritz Kedding



Illustrated by Terri Murphy



Genre	Build Background	Access Content	Extend Language
Mystery Story	• Inquiry and Investigation • Measurement • Observation	• Definitions • Labels • Fact Box	• Past Tense Verbs

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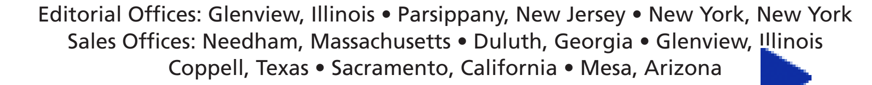
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Marco sat beside his sister on the front steps of their house. Inez was putting on her soccer cleats. She was in a hurry, and she looked upset.

"Why am I doing this?" she said. "Why am I letting you bring lemonade to the game again?"

"People liked drinking my lemonade at the last game," protested Marco.

"They didn't like it," she said. "They were just being polite!"

"It was a little sour," said Marco.

"It was very sour!"

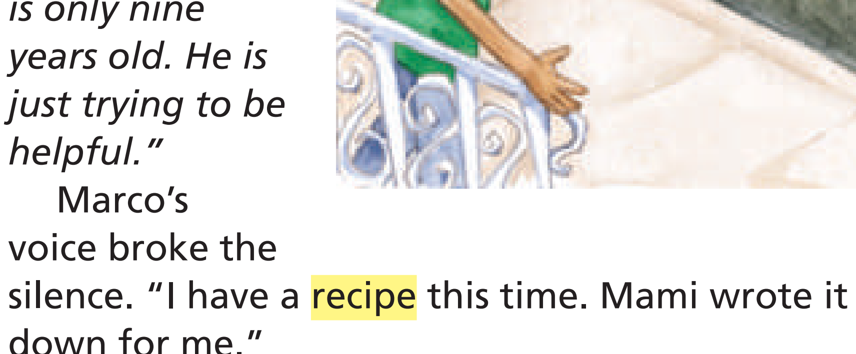
Marco looked hurt. "I didn't know I had to put sugar in it. Lemonade doesn't taste like it has sugar in it." Inez knew lemonade is sweet.

polite: kind, nice

sour: having a taste like lemon juice; not sweet



Inez was still unsure about her brother's lemonade, but she remembered her mother's words. *"Marco is only nine years old. He is just trying to be helpful."*



Marco's voice broke the silence. "I have a recipe this time. Mami wrote it down for me."

"Okay," said Inez. "Be at the soccer field in an hour and a half! It's going to be a hot day. So make enough lemonade for the whole team. That means three gallons! And add sugar!"

Inez grabbed the soccer ball and hurried across the street into the park.

Marco bit his lip. *I'd better do it right this time,* he thought.

recipe: directions for preparing a kind of food or drink



First, Marco had to pick the lemons. He went out to the lemon tree in his backyard. There were a lot of lemons! Marco picked lemons until his basket was full.

When Marco returned to the kitchen, he looked at the clock. "Yikes!" he said aloud. "I've only got a half hour to make this lemonade!"

Marco's parents were busy people. Marco's mother worked in a chemistry lab in the city. His dad worked at home on computers. He had an office upstairs. Marco tried not to bother him during work hours. Still, Papá was always helpful when Inez or Marco needed him.

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chemistry lab: a place for doing chemical science experiments

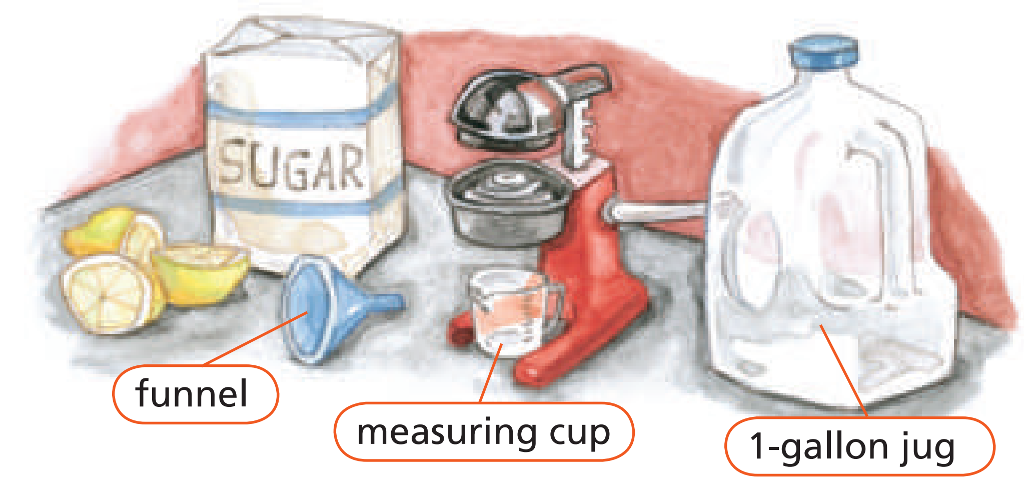
Marco went to his dad's office upstairs and asked his dad, "Papá, can you help me cut the lemons for the lemonade I will make?"

As Papá cut the lemons, Marco gathered all the kitchen tools he would need. He put three 1-gallon jugs on the table.

It didn't take long to cut the lemons. "Do you know how to do the rest?" asked Papá.

Marco nodded. "Yes, Papá, I can do it."





Mami's recipe said: Mix 12 cups of water, 2 cups of lemon juice, and 2 cups of sugar.

Marco did the math on a sheet of paper. He added 12 + 2 + 2 = 16. *Okay,* he thought. *There are sixteen cups in a gallon, so this recipe will make one gallon. I need to make the recipe amount three times to make 3 gallons of lemonade.*

Marco squeezed the lemons and measured 2 cups of lemon juice into each jug. Next, he put 12 cups of water into each jug. Then he looked at the clock. He had to be at the soccer field in 10 minutes!

Did You Know? **Measurements**

Liquids can be measured in these amounts: cups, pints, quarts, and gallons.

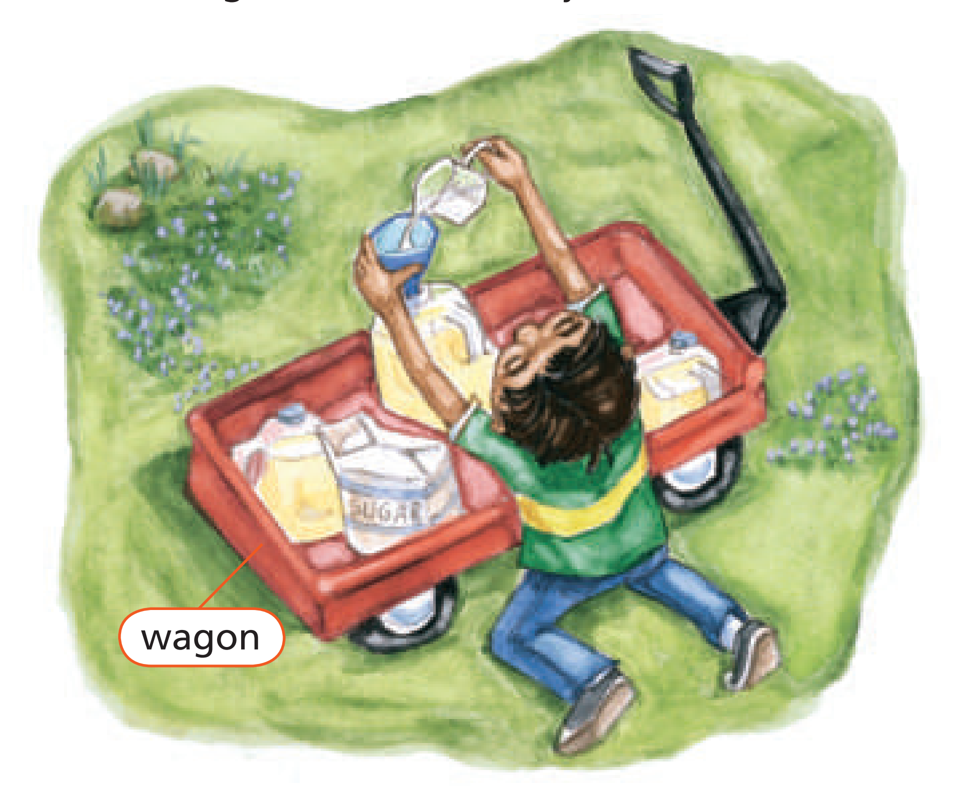
2 cups = 1 pint	4 quarts = 1 gallon
2 pints = 1 quart	16 cups = 1 gallon
4 cups = 1 quart	

When people cook, they often measure dry ingredients like sugar and flour in measuring cups too.

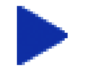
There's no time to add the sugar, thought Marco. *I can put the sugar in at the field. I'll take it with me.*

Marco put everything into a wagon and went out to the park. He looked both ways before crossing the street. Then he crossed, pulling the wagon carefully.

When he got to the soccer field, it was almost halftime. Quickly, Marco set the funnel in the first container. Then, very carefully, he measured 2 cups of sugar and poured it into the jug. Next, he measured 2 cups of sugar into each of the other jugs. He put the lid on each jug and shook it. The sugar mixed with the juice and water.



halftime: a rest break in the middle of the game

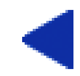




The job was done. But wait! Marco looked at the jugs. *Something is wrong!* he thought. *Where did the sugar go? I added the sugar, but the jugs are still not full. There is only a little more lemonade than before I added the sugar.*

Just then, the buzzer sounded. It was halftime. The players came running off the field. They were hot and thirsty!

Marco picked up a container and started pouring lemonade into cups. Inez helped him pour lemonade into cups for her thirsty teammates. The players gave Marco a "thumbs up." The lemonade was good this time. They drank cups and cups of it.



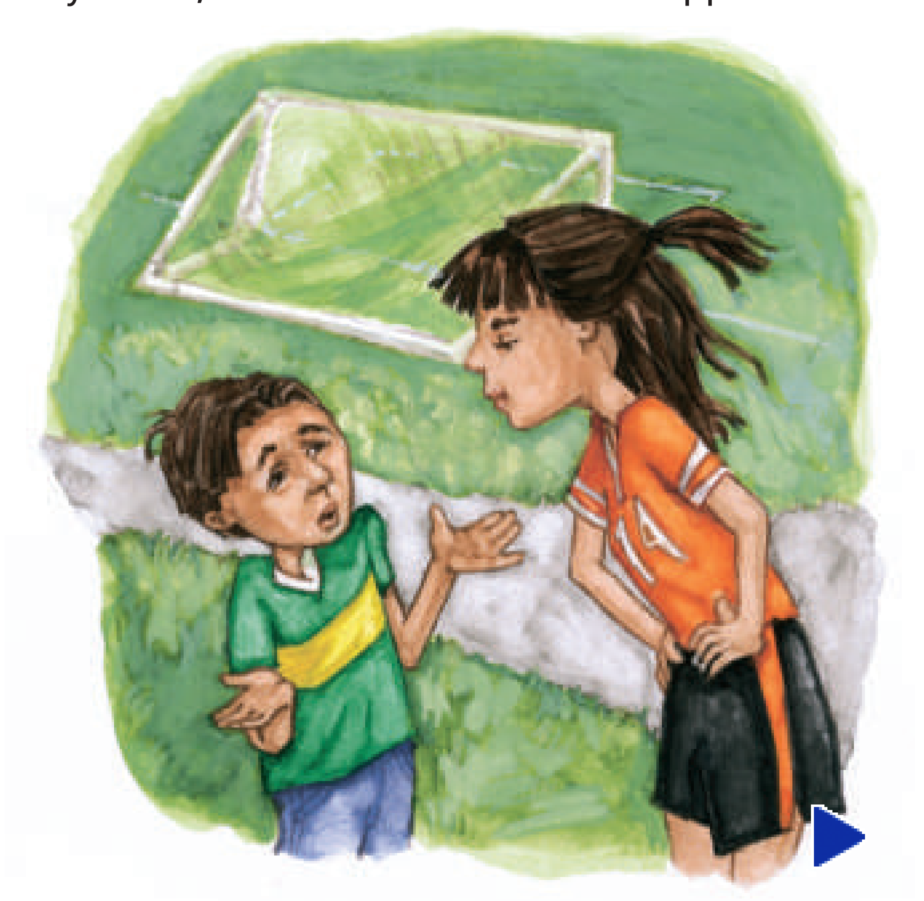
As the players rested, Inez pulled Marco aside. "I told you to make three gallons of lemonade. The containers are more than half empty now. There won't be any left for after the game!"

Marco tried to defend himself. "All the ingredients added up to three gallons."

"They couldn't have," said Inez. "Those containers were not full!"

"I know," said Marco. "But I measured everything really, really carefully. I don't know what happened. I'm stumped!"

"I'll tell you what," said Inez. "We have another game tomorrow. So tonight I will make the lemonade with you. We'll do exactly what you did, and we'll find out what happened."





That afternoon, Marco and Inez picked more lemons. Later, as Papá cooked dinner, Marco and Inez did an experiment at the kitchen table.

Inez and Marco did everything exactly the way Marco had done it earlier during the day. They squeezed the lemons and added 2 cups of lemon juice to each of three jugs. They added 12 cups of water to each jug. Now there were 14 cups of liquid in each jug. The last step was to add the sugar.

Inez grabbed the bag of sugar. "Let me measure the sugar," she said. Carefully, she measured 2 cups of sugar. "Okay," she said. "We're adding 2 cups to 14 cups. That makes 16 cups, or one gallon."

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experiment: a test to try out an idea or see how something works



Inez added each cup of sugar slowly. The sugar fell into the mixture of water and lemon juice. However, something strange was happening. The sugar seemed to just disappear. After adding the sugar, the container still wasn't full!

Inez and Marco performed the same experiment with all three jugs. Every time, the same thing happened.

"This is weird," said Inez.

"I told you," said Marco.

When Mami came home, the family sat down to dinner. "How was your day?" Mami asked at the table.

"Weird," said Marco and Inez.

"What happened?" asked Mami.

Inez and Marco told her the story. They were both baffled. Mami just smiled.

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weird: strange







Inez asked, "What happened? Why didn't the containers get full?"

Mami answered, "Because the sugar dissolved into the water and juice. Sugar is made of tiny bits called molecules. Water is made of molecules too. There is space between the molecules. When sugar dissolves into liquid, it fits into some of those spaces. It looks like the sugar disappeared, but really it just filled in the spaces."

"So, you shouldn't be mad at Marco," said Mami. "There was nothing wrong with his math. He just didn't know that sugar dissolves in water."

"Well, the mystery is solved!" said Marco.

"Yes," said Inez. "Maybe you should make lemonade for all of our games. You're good at it!"

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dissolved: mixed into a liquid

Talk About It

1. Why did Marco think the ingredients will make one whole gallon of lemonade?
2. Why didn't the 12 cups of water, 2 cups of juice, and 2 cups of sugar make a gallon of lemonade?

Write About It

3. The order of events in a story is called the *plot*. On a separate paper, create a chart of this story's plot. Be sure to tell the conclusion

Problem	Marco made a mistake the last time he made lemonade. He has to do it right this time.
Events	Marco picks lemons.
Conclusion:	

Extend Language

The ending *-ed* can be attached to many verbs to change a verb from the present tense to the past tense. *Work* and *-ed* makes *worked*.

What are the *-ed* forms of the following verbs in the story?

look   pick   gather   cross

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